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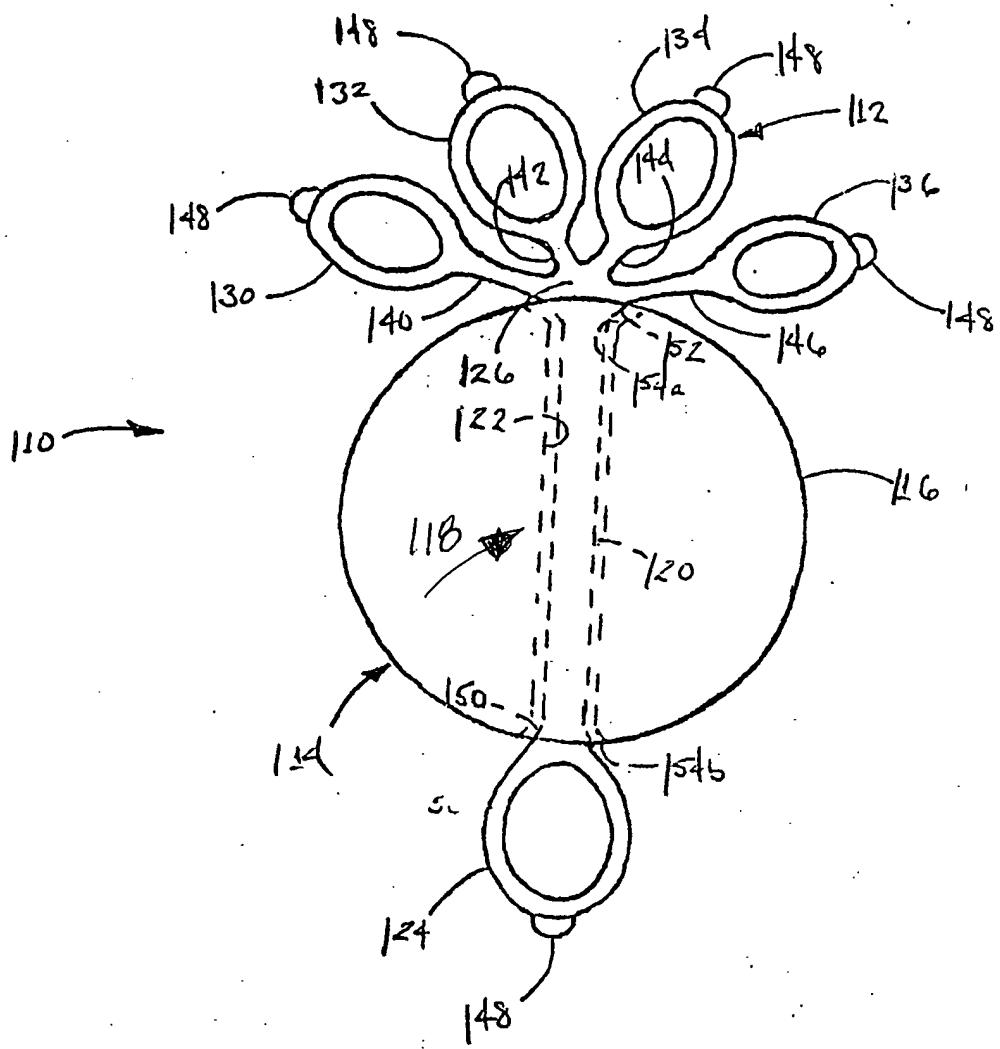


FIG. 1

PRIOR ART

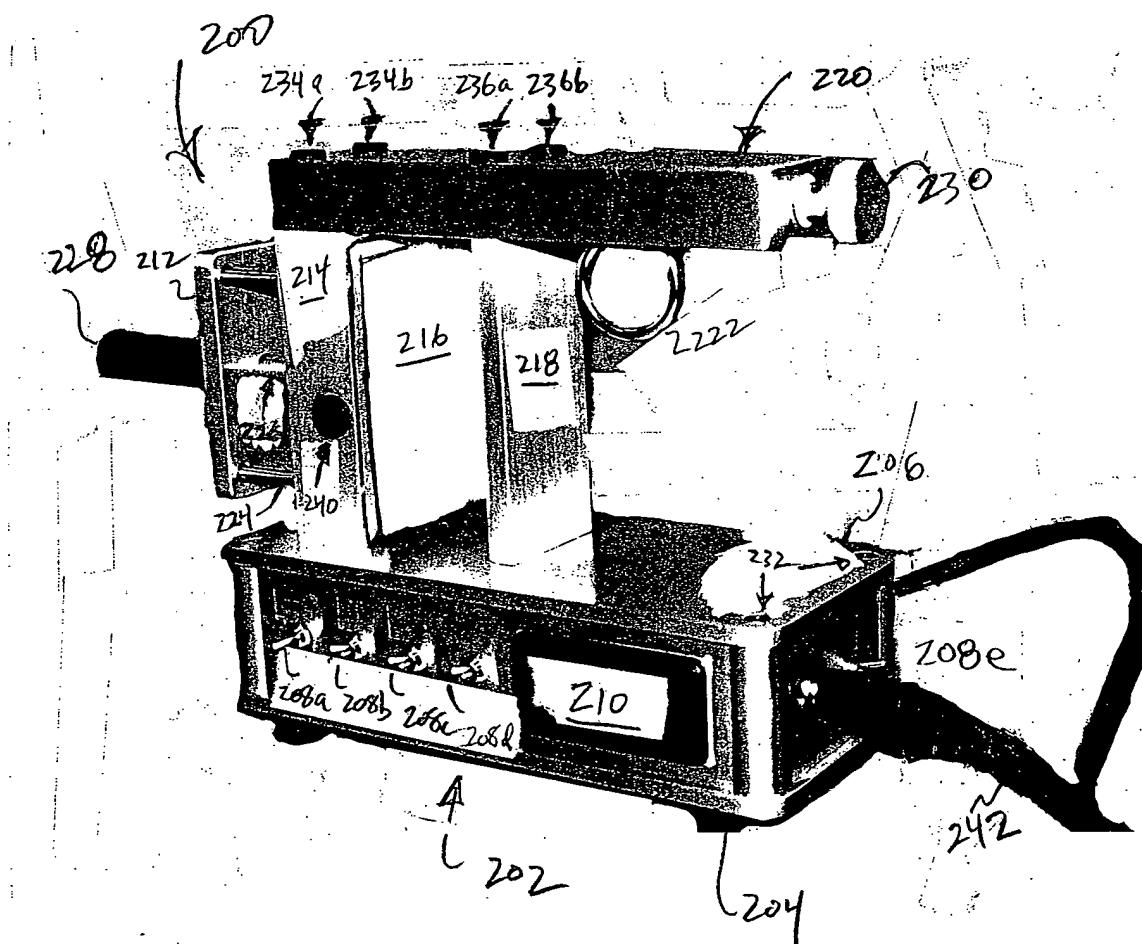


FIG 2A

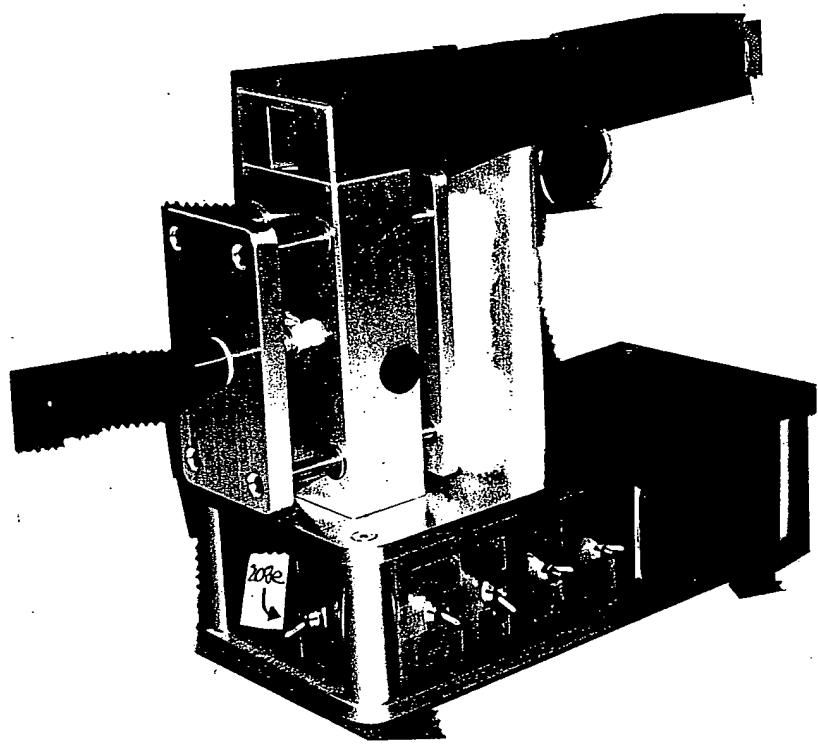


FIG. 23

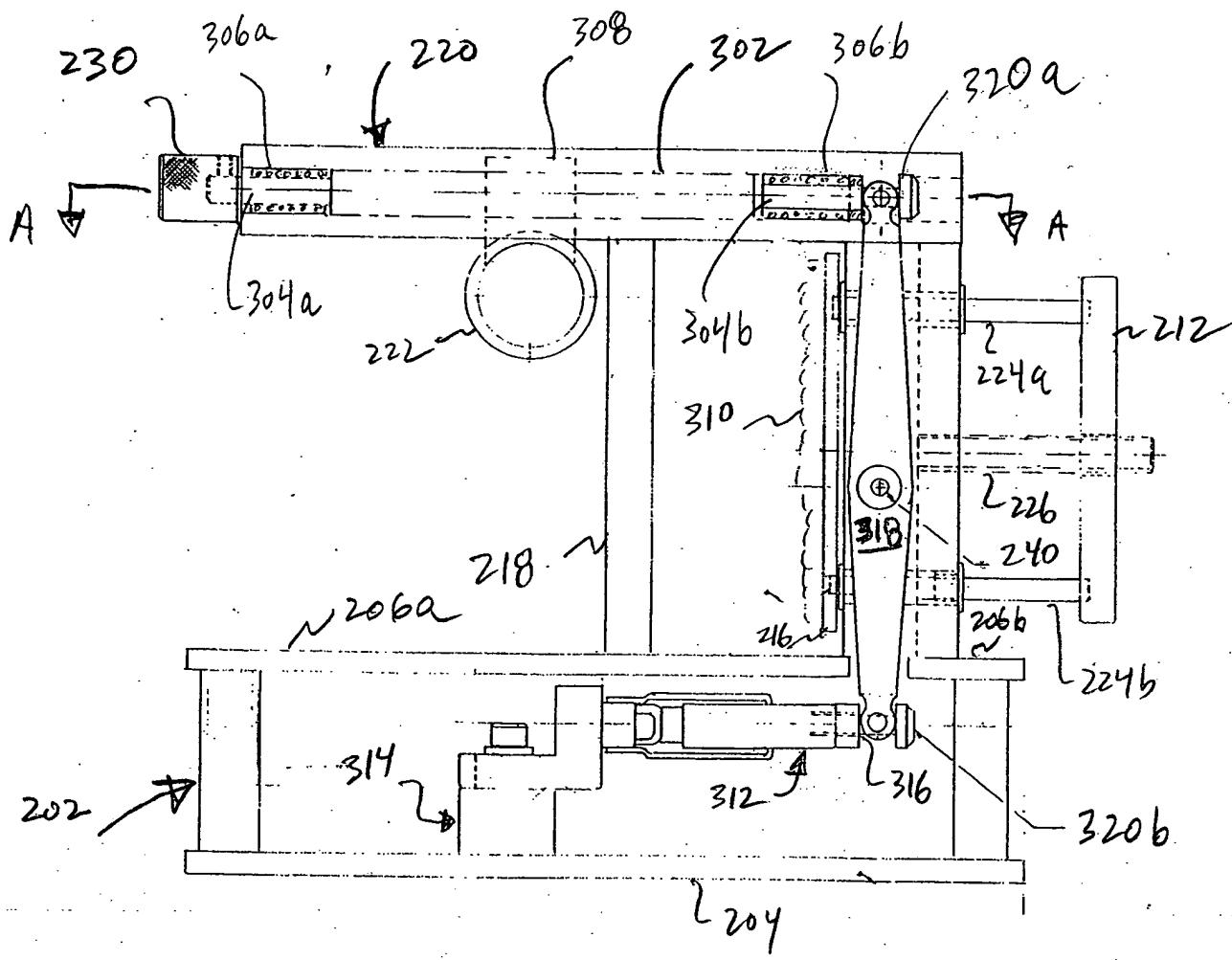


FIG. 3

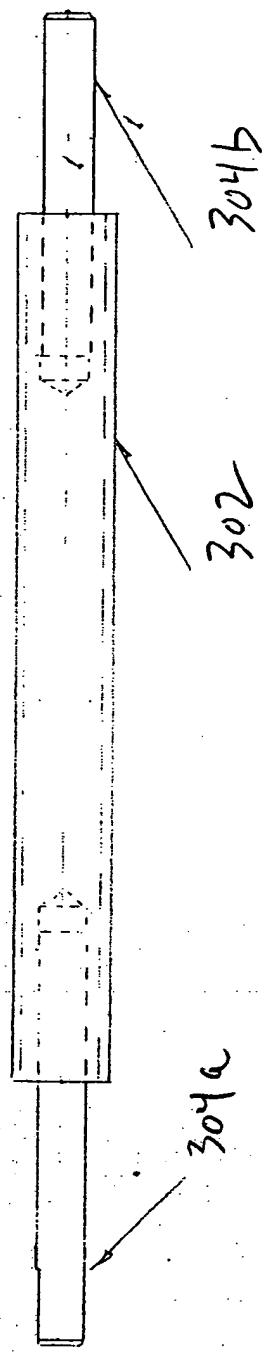


Fig. 4

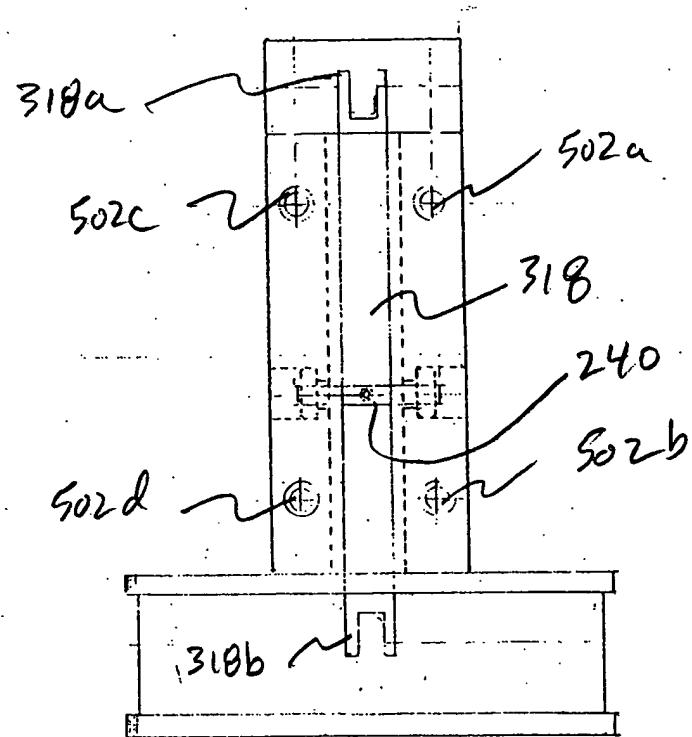


FIG. 5

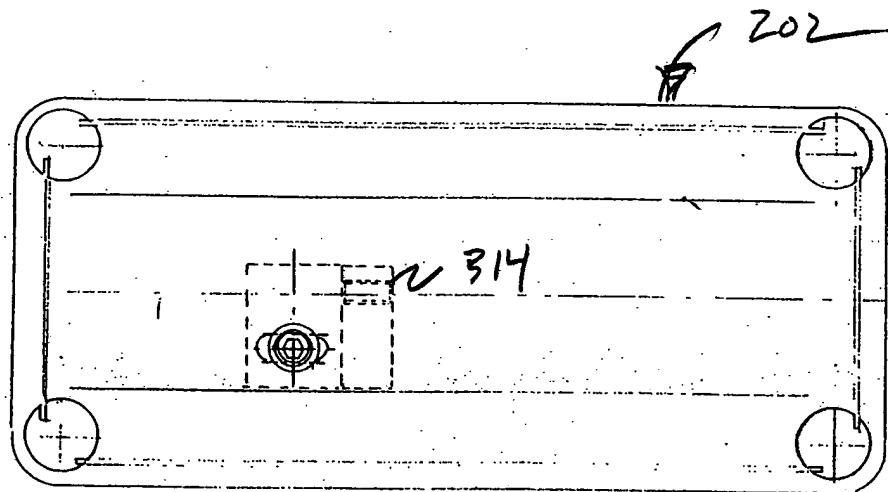


FIG. 6

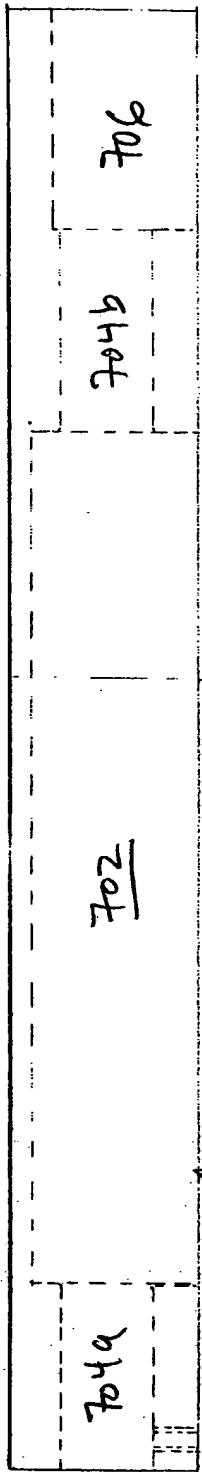


Fig. 7B

220

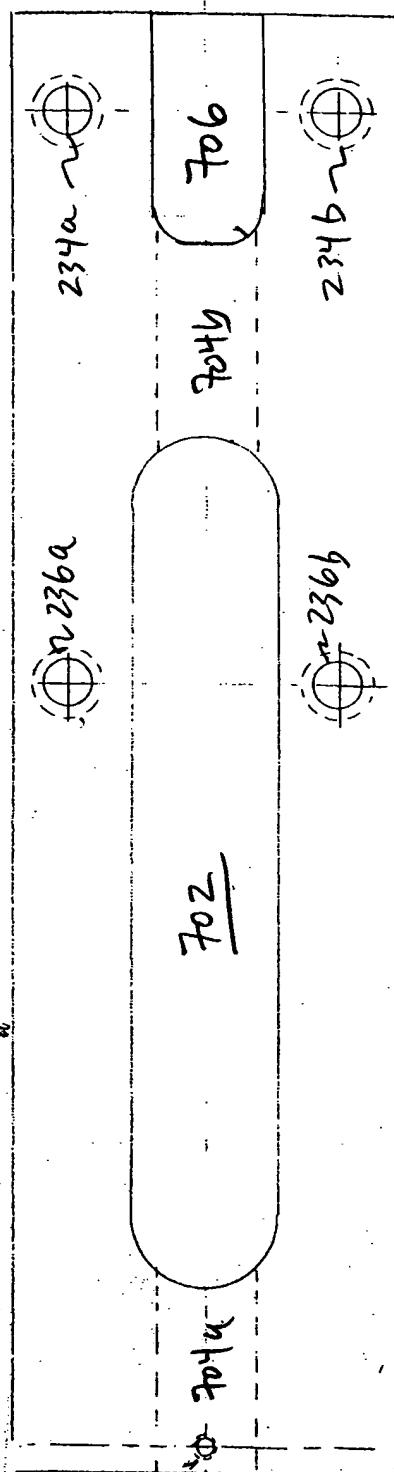


Fig. 7A

74

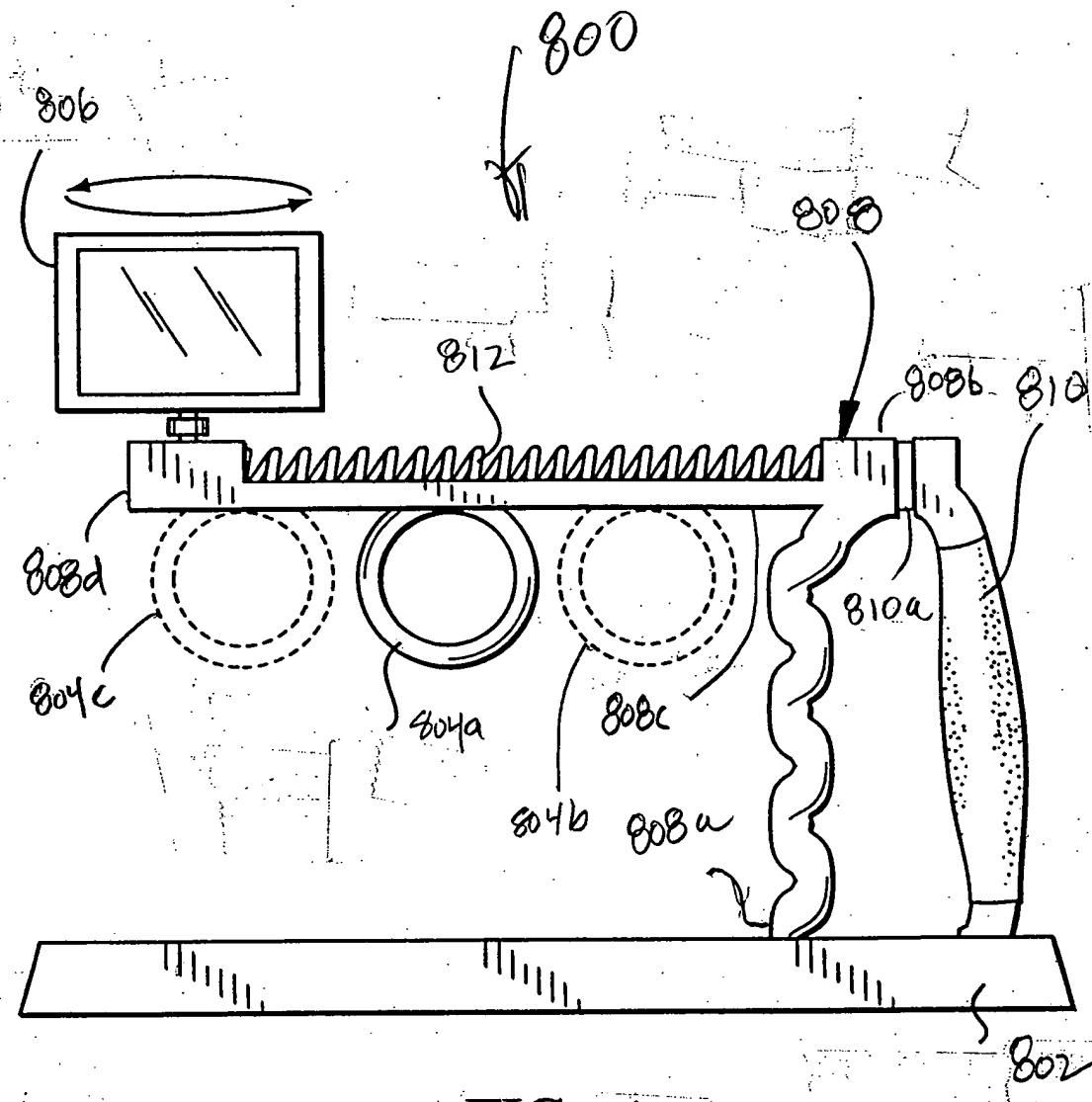


FIG. 8A

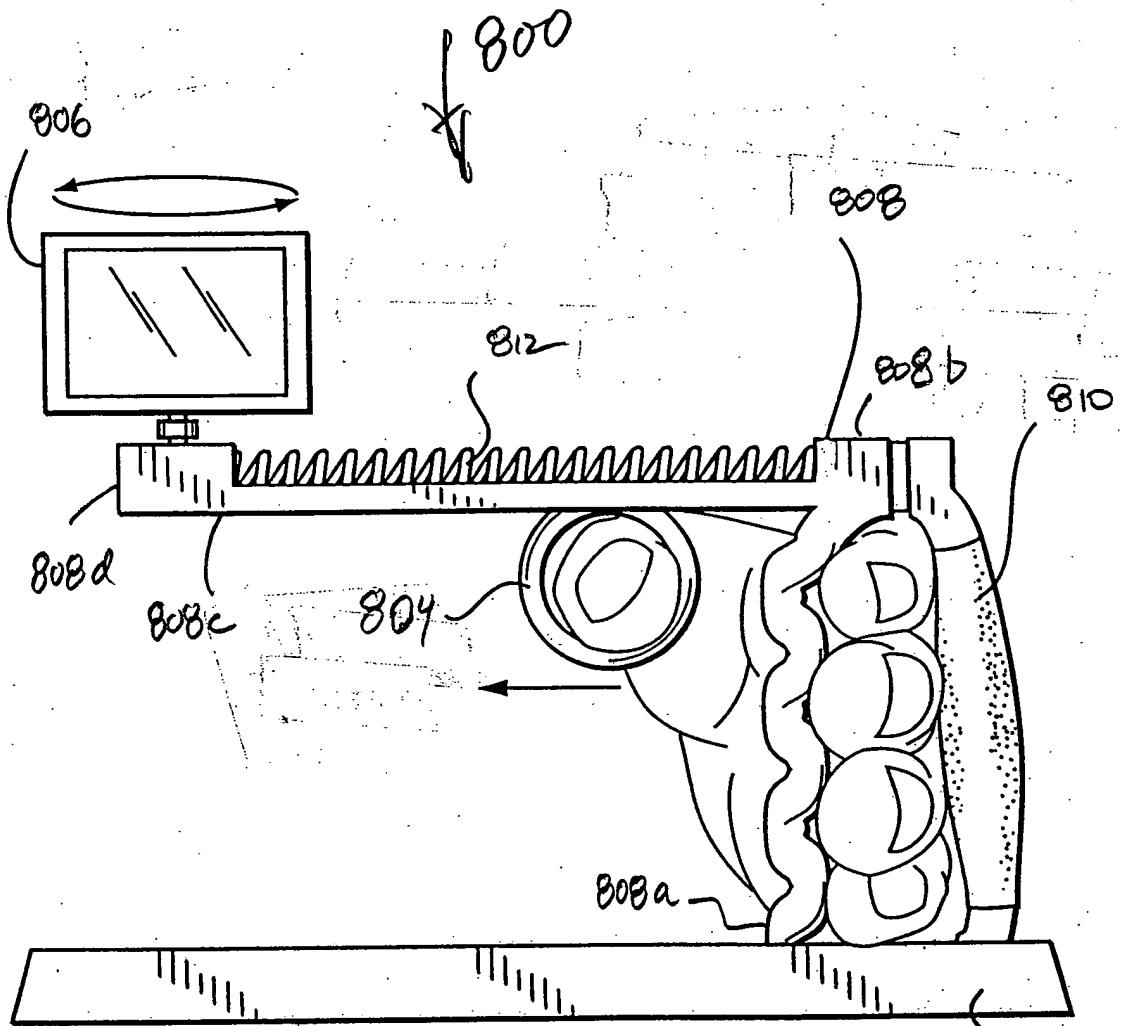


FIG. 8B

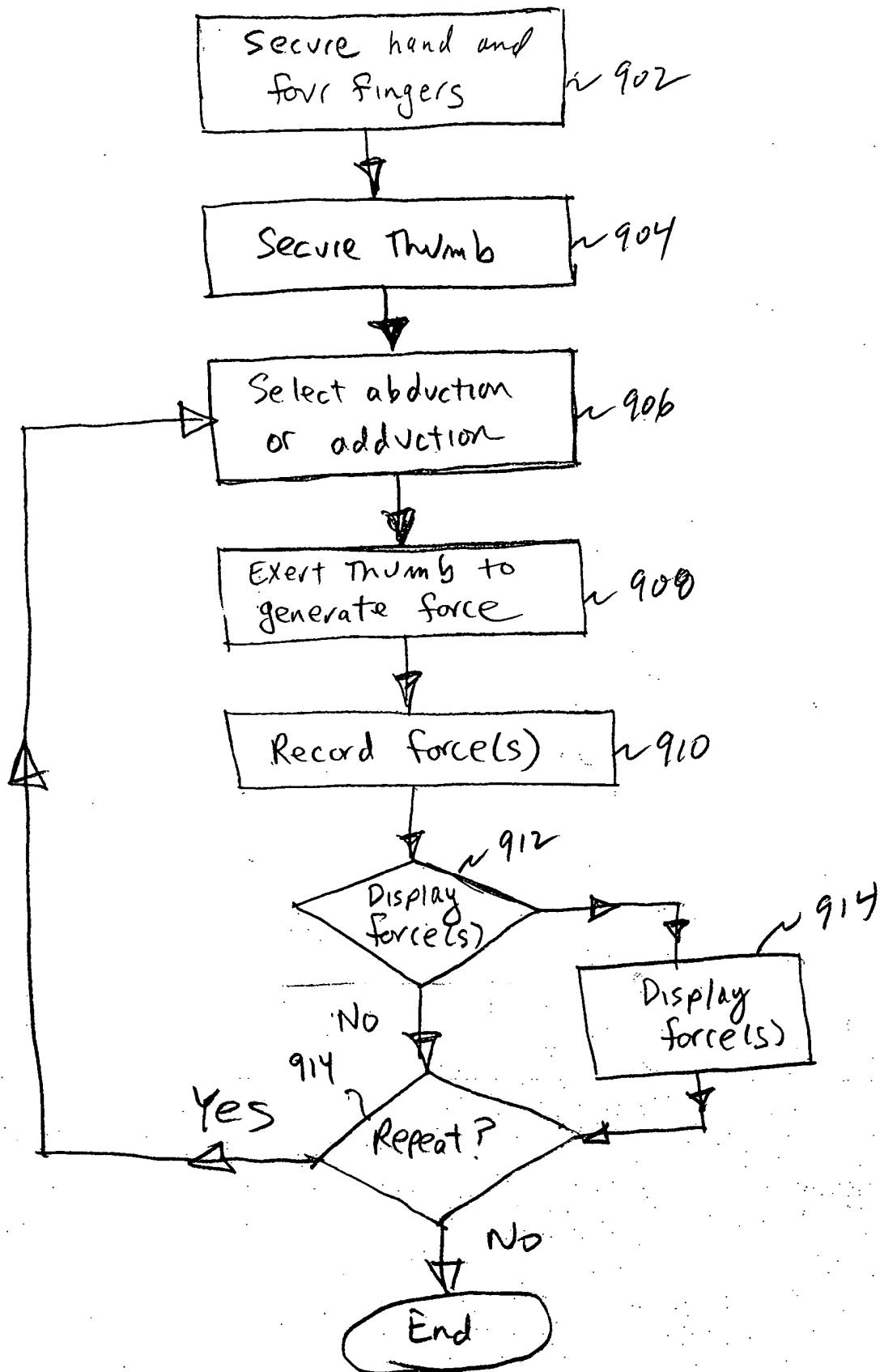
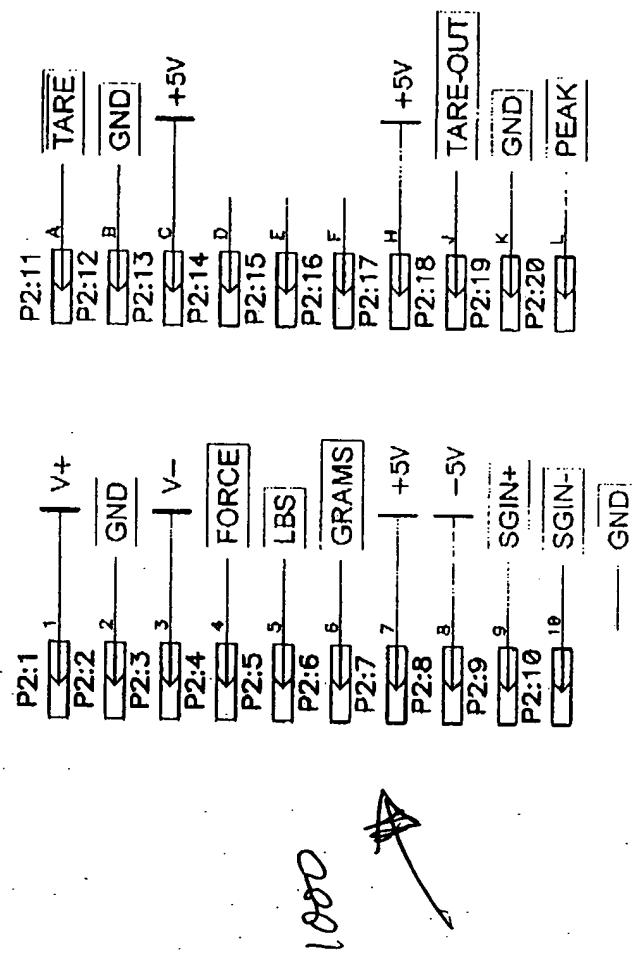


Fig. 9



GND =

Fig. 10

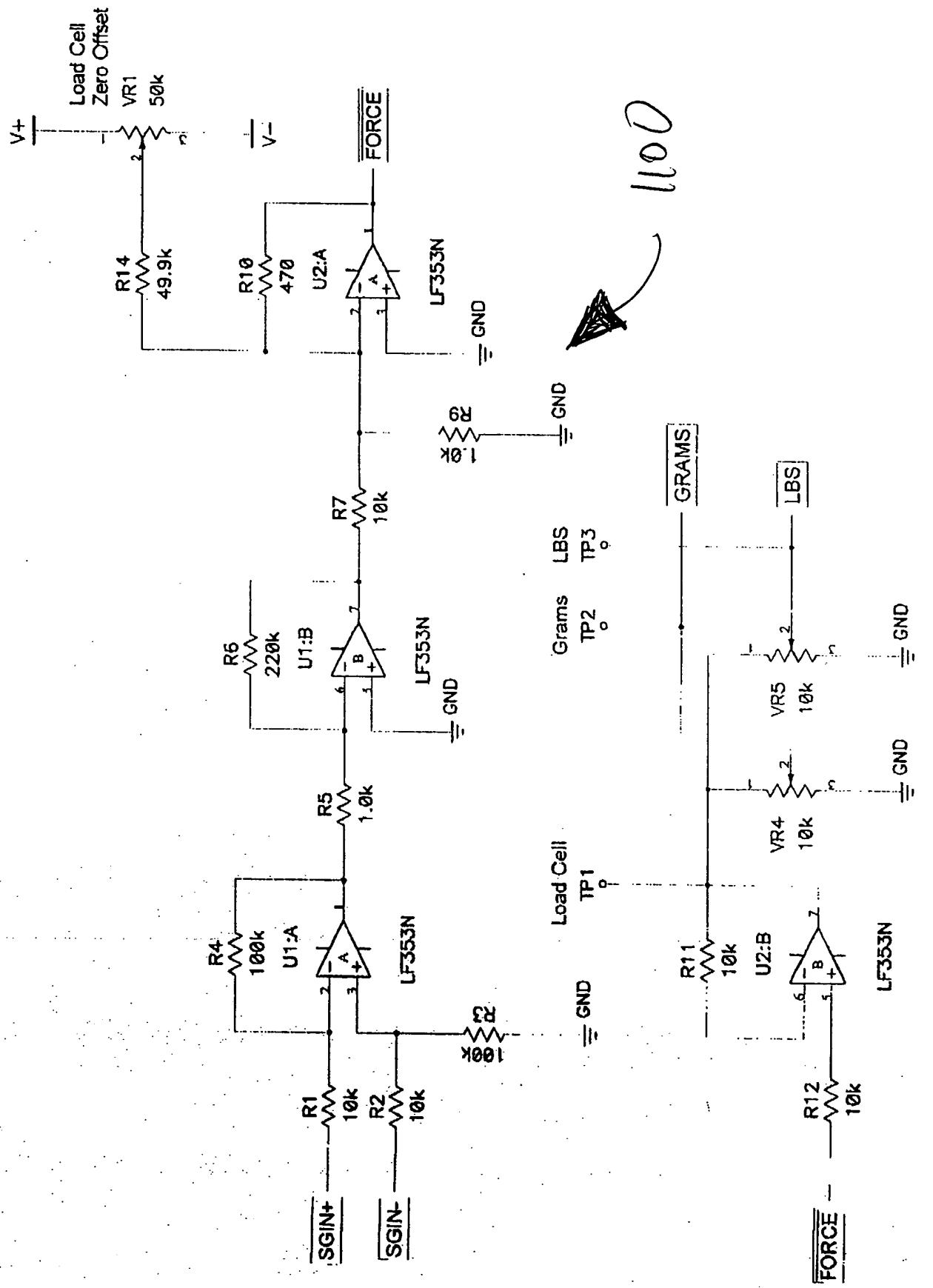


Fig. 11

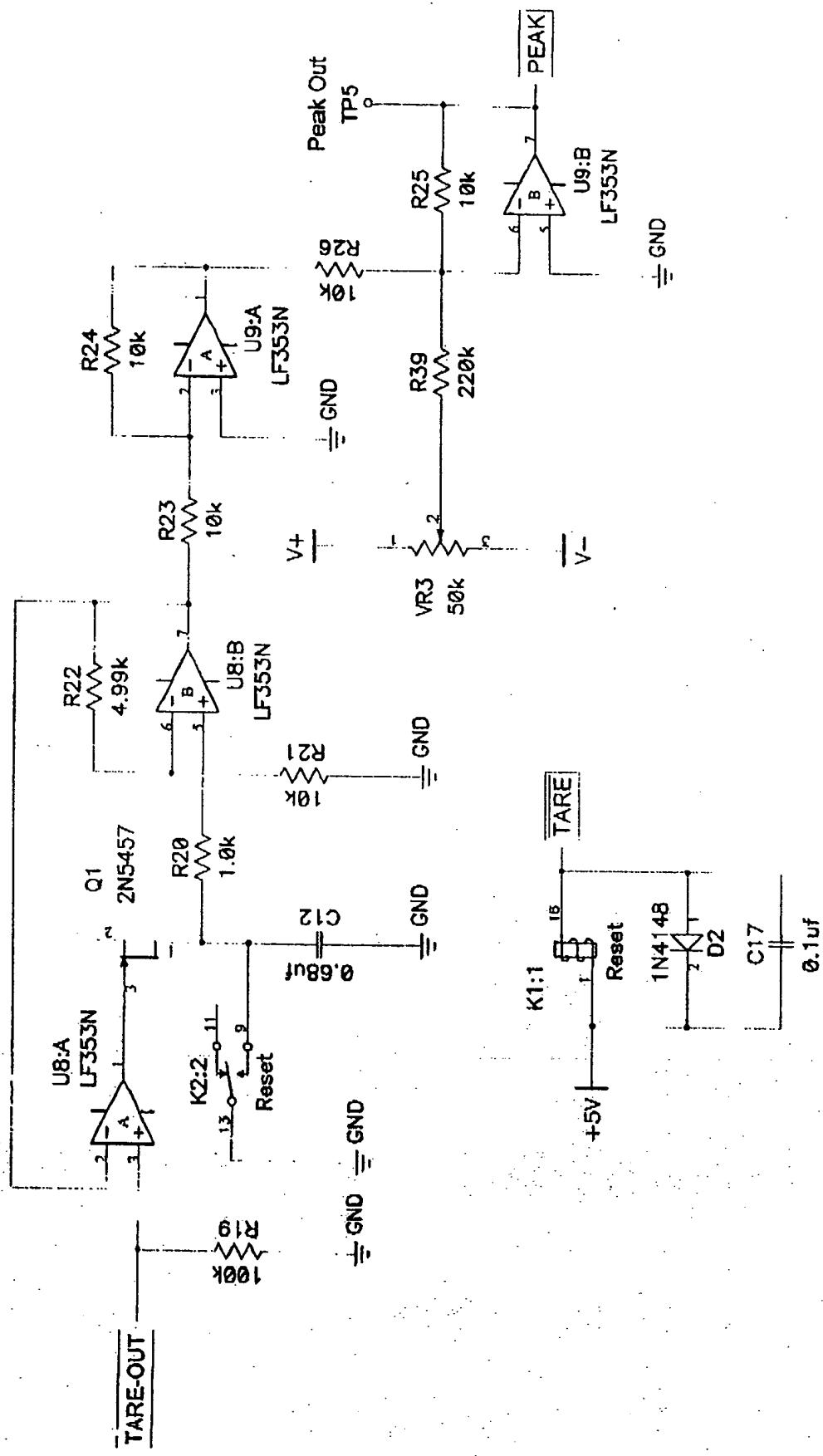


Fig. 12

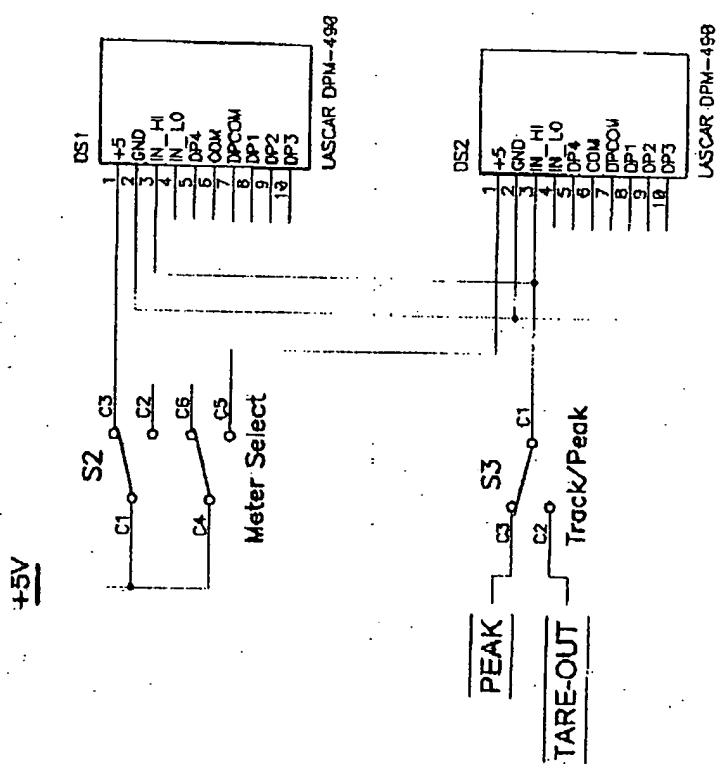


Fig. 13

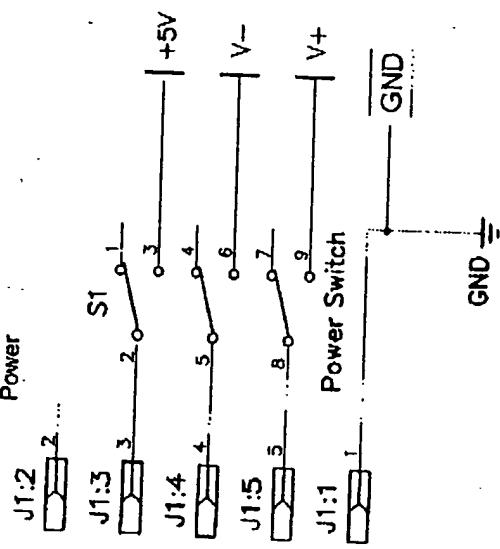


Fig. 14

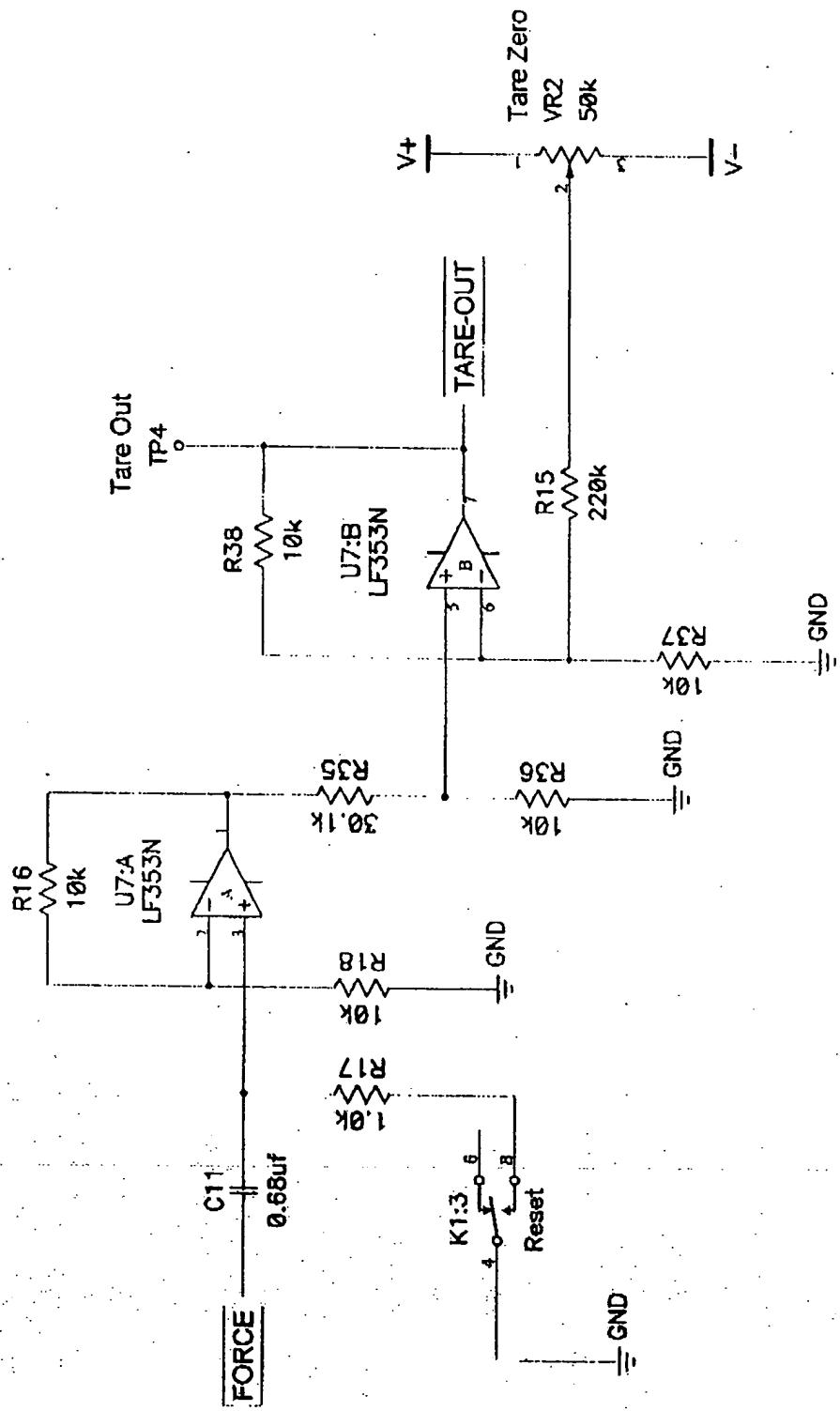


Fig. 15

Characteristics of Subjects: Age, Weight, Sex for Right Dominant										
Age	Male-Weight									Total
	50-99	100-124	125-149	150-174	175-199	200-224	225-249	250-300	Total	
5 to 9	2	12	9	10	3	2	2	2	23	23
10 to 14	2	3	16	5	2	11	3	2	22	22
15 to 19	3	2	8	11	3	11	1	1	24	24
20 to 24	4	2	6	11	1	4	1	1	21	21
25 to 29	1	1	7	11	4	1	1	1	25	25
30 to 34	2	2	6	11	1	4	2	1	19	19
35 to 39	1	1	7	11	4	1	2	1	25	25
40 to 44	1	1	3	9	3	3	3	1	26	26
45 to 49	1	1	4	12	5	2	3	1	26	26
50 to 54	1	1	2	12	7	3	1	1	20	20
55 to 59	2	6	10	1	1	1	1	1	23	23
60 to 64	3	7	9	3	3	1	1	1	21	21
65 to 69	4	8	6	3	3	1	1	1	21	21
Total	12	12	38	73	99	32	12	3	275	275
Female-Weight										Grand Total
Age	50-99	100-124	125-149	150-174	175-199	200-224	225-249	250-300	Total	Grand Total
5 to 9	2	2	2	2	2	2	2	2	4	4
10 to 14	3	17	4	4	4	4	4	4	24	47
15 to 19	8	13	2	2	2	2	2	2	23	45
20 to 24	4	15	3	3	3	3	3	3	24	50
25 to 29	1	8	6	6	6	6	6	6	1	49
30 to 34	8	12	4	4	4	4	4	4	22	43
35 to 39	1	10	7	4	4	4	4	4	31	56
40 to 44	8	9	8	8	8	8	8	8	21	40
45 to 49	8	15	15	15	15	15	15	15	24	49
50 to 54	4	13	13	13	13	13	13	13	20	46
55 to 59	11	6	3	2	2	2	2	2	20	40
60 to 64	5	8	6	6	6	6	6	6	20	43
65 to 69	5	9	7	7	7	7	7	7	21	42
Total	5	45	104	81	33	4	3	3	275	275

Fig. 16

Joint Age Weight Abduction-Right

Fig. 17

Joint Age Weight Abduction-Left

Age	Joint Age Weight Abduction-Left						Joint Age Weight Abduction-Left					
	Male-Weight			Female-Weight			Male-Weight			Female-Weight		
50-99	100-124	125-149	150-174	175-199	200-224	50-99	100-124	125-149	150-174	175-199	200-224	
5 to 9												
10 to 14	2.3	2.7					1.6	2.4	2.6			
15 to 19		3.4	4.7	5.5				2.6	2.4			
20 to 24		3.9	5.0	6.5				3.2	2.5	2.3		
25 to 29			5.5	5.7	8.4			2.2	2.7	2.9		
30 to 34				5.4					2.6	3.0	2.2	
35 to 39				4.5	5.5	6.0			2.3	2.7	2.9	3.9
40 to 44				3.2	4.3	5.1	4.3			2.2	2.6	
45 to 49				4.5	4.7	5.5				2.6	2.6	
50 to 54				4.6	5.8	6.0				2.6	2.6	
55 to 59				3.3	4.0					1.9	2.2	
60 to 64		3.5	3.3	3.0	5.0					2.3	2.7	3.0
65 to 69		3.0	3.2	3.5	4.1					1.7	2.3	2.5
										1.9	2.3	3.0
5 to 9												
10 to 14	2.0	2.1										
15 to 19		2.5	4.2	4.3							2.5	
20 to 24		3.4	4.3	4.6							2.0	
25 to 29			4.9	5.1	5.4						2.2	
30 to 34			3.1	4.5						1.7		
35 to 39			3.9	4.8	5.4					2.6		
40 to 44			2.7	3.5	4.2	4.0				2.4		
45 to 49			3.2	4.0	4.7					2.0		
50 to 54			4.0	4.1	4.8	5.5				2.5		
55 to 59			2.8	3.8						1.8		
60 to 64		3.1	3.0	2.4	4.4					1.9		
65 to 69		2.6	2.8	3.0	3.4					2.2		
										2.3		
5 to 9												
10 to 14	1.4	1.6									2.5	
15 to 19		2.3	3.2	3.5							2.0	
20 to 24		2.9	3.3	3.7							2.0	
25 to 29			3.6	4.2	3.2						1.8	
30 to 34			2.6	3.9							1.1	
35 to 39			2.7	3.5	4.8						1.7	
40 to 44			2.0	2.9	3.1	3.1					1.2	
45 to 49			3.2	2.8	3.5						1.2	
50 to 54			3.0	3.8	4.4						1.6	
55 to 59			2.0	2.9							1.7	
60 to 64		2.8	2.3	1.8	3.5						1.5	
65 to 69		1.7	2.2	2.1	2.7						1.5	
											1.2	
5 to 9												
10 to 14	1.4	1.6									2.0	
15 to 19		2.3	3.2	3.5							2.0	
20 to 24		2.9	3.3	3.7							1.8	
25 to 29			3.6	4.2	3.2						1.1	
30 to 34			2.6	3.9							1.9	
35 to 39			2.7	3.5	4.8						1.7	
40 to 44			2.0	2.9	3.1	3.1					1.8	
45 to 49			3.2	2.8	3.5						1.4	
50 to 54			3.0	3.8	4.4						1.6	
55 to 59			2.0	2.9							1.4	
60 to 64		2.8	2.3	1.8	3.5						1.6	
65 to 69		1.7	2.2	2.1	2.7						1.7	
											1.2	
5 to 9												
10 to 14	1.4	1.6									2.0	
15 to 19		2.3	3.2	3.5							2.0	
20 to 24		2.9	3.3	3.7							1.8	
25 to 29			3.6	4.2	3.2						1.1	
30 to 34			2.6	3.9							1.9	
35 to 39			2.7	3.5	4.8						1.7	
40 to 44			2.0	2.9	3.1	3.1					1.8	
45 to 49			3.2	2.8	3.5						1.4	
50 to 54			3.0	3.8	4.4						1.6	
55 to 59			2.0	2.9							1.7	
60 to 64		2.8	2.3	1.8	3.5						1.5	
65 to 69		1.7	2.2	2.1	2.7						1.5	
											1.2	
5 to 9												
10 to 14	1.4	1.6									2.0	
15 to 19		2.3	3.2	3.5							2.0	
20 to 24		2.9	3.3	3.7							1.8	
25 to 29			3.6	4.2	3.2						1.1	
30 to 34			2.6	3.9							1.9	
35 to 39			2.7	3.5	4.8						1.7	
40 to 44			2.0	2.9	3.1	3.1					1.8	
45 to 49			3.2	2.8	3.5						1.4	
50 to 54			3.0	3.8	4.4						1.6	
55 to 59			2.0	2.9							1.7	
60 to 64		2.8	2.3	1.8	3.5						1.5	
65 to 69		1.7	2.2	2.1	2.7						1.5	
											1.2	
5 to 9												
10 to 14	1.4	1.6									2.0	
15 to 19		2.3	3.2	3.5							2.0	
20 to 24		2.9	3.3	3.7							1.8	
25 to 29			3.6	4.2	3.2						1.1	
30 to 34			2.6	3.9							1.9	
35 to 39			2.7	3.5	4.8						1.7	
40 to 44			2.0	2.9	3.1	3.1					1.8	
45 to 49			3.2	2.8	3.5						1.4	
50 to 54			3.0	3.8	4.4						1.6	
55 to 59			2.0	2.9							1.7	
60 to 64		2.8	2.3	1.8	3.5						1.5	
65 to 69		1.7	2.2	2.1	2.7						1.5	
											1.2	
5 to 9												
10 to 14	1.4	1.6									2.0	
15 to 19		2.3	3.2	3.5							2.0	
20 to 24		2.9	3.3	3.7							1.8	
25 to 29			3.6	4.2	3.2						1.1	
30 to 34			2.6	3.9							1.9	
35 to 39			2.7	3.5	4.8						1.7	
40 to 44			2.0	2.9	3.1	3.1					1.8	
45 to 49			3.2	2.8	3.5						1.4	
50 to 54			3.0	3.8	4.4						1.6	
55 to 59			2.0	2.9							1.7	
60 to 64		2.8	2.3	1.8	3.5						1.5	
65 to 69		1.7	2.2	2.1	2.7						1.5	
											1.2	
5 to 9												
10 to 14	1.4	1.6									2.0	
15 to 19		2.3	3.2	3.5							2.0	
20 to 24		2.9	3.3	3.7							1.8	
25 to 29			3.6	4.2	3.2						1.1	
30 to 34			2.6	3.9							1.9	
35 to 39			2.7	3.5	4.8						1.7	
40 to 44			2.0	2.9	3.1	3.1					1.8	
45 to 49			3.2	2.8	3.5						1.4	
50 to 54			3.0	3.8	4.4						1.6	
55 to 59			2.0	2.9							1.7	
60 to 64		2.8	2.3	1.8	3.5						1.5	
65 to 69		1.7	2.2	2.1	2.7						1.5	
											1.2	
5 to 9												
10 to 14	1.4	1.6									2.0	
15 to 19		2.3	3.2	3.5							2.0	
20 to 24		2.9	3.3	3.7							1.8	
25 to 29			3.6	4.2	3.2						1.1	
30 to 34			2.6	3.9							1.9	
35 to 39			2.7	3.5	4.8						1.7	
40 to 44			2.0	2.9	3.1	3.1					1.8	
45 to 49			3.2	2.8	3.5						1.4	
50 to 54			3.0	3.8	4.4							

Joint Age Weight Adduction-Right

Ag	Joint Age Weight Adduction-Right						Joint Age Weight Adduction-Right						
	Male-Weight			Female-Weight			Male-Weight			Female-Weight			
50-59	100-124	125-149	150-174	175-199	200-224	225-249	250-300	50-99	100-124	125-149	150-174	175-199	200-224
5 to 9													
10 to 14	11.8	12.8						10.9	10.7	11.9			
15 to 19		14.3	16.2	16.4					11.9	13.5			
20 to 24		15.2	17.4	18.5					13.2	14.4	14.0		
25 to 29			17.8	19.7	20.8				10.8	15.2	16.0		
30 to 34			17.4	17.4					12.9	16.4	16.2		
35 to 39			18.5	16.9	19.2				12.0	14.1	14.4	12.2	
40 to 44			17.1	16.0	20.9	18.0				13.7	12.9		
45 to 49			15.3	17.1	18.2					12.0	14.8		
50 to 54				16.5	17.3	15.6				13.1	13.8		
55 to 59			14.3	16.1						13.5	16.2	15.6	
60 to 64			12.9	13.8	12.4	16.3				12.0	13.0	13.3	
65 to 69			12.6	13.4	15.5	13.1				11.0	12.3	14.1	
Angle = 30°								Angle = 30°					
5 to 9													
10 to 14	11.9	13.3						11.9	11.3	12.8			
15 to 19		15.9	18.0	18.6					12.7	15.0			
20 to 24		18.0	18.4	20.7					14.9	15.1	15.2		
25 to 29			19.1	21.3	20.9				11.6	16.6	17.8		
30 to 34			19.4	18.8						14.2	17.4	17.2	
35 to 39			20.7	18.4	19.2				12.6	14.9	15.7	15.4	
40 to 44			17.5	16.2	19.9	20.4				14.5	13.7		
45 to 49			16.9	19.1	19.4					13.4	16.1		
50 to 54				18.2	18.9	16.9					15.7	15.1	
55 to 59			14.6	17.5							15.1	16.9	17.5
60 to 64			12.4	15.6	13.6	17.1					11.9	14.9	14.7
65 to 69			13.5	14.6	16.5	15.4					12.7	12.8	15.1
Angle = 45°								Angle = 45°					
5 to 9													
10 to 14	13.2	14.2							12.5	13.2	14.2		
15 to 19		17.5	19.3	19.1						13.4	16.0		
20 to 24		20.3	20.5	21.7						15.8	16.7	14.9	
25 to 29			21.2	22.2	22.1					12.3	18.4	18.9	
30 to 34			20.3	20.9						15.0	19.3	15.7	
35 to 39			21.8	20.3	20.3					14.1	17.1	17.1	14.4
40 to 44			20.7	18.1	22.1	21.2					16.8	14.6	
45 to 49			18.5	20.5	21.1						14.4	16.4	
50 to 54				20.3	21.1	19.0					15.5	15.8	
55 to 59			15.4	18.8							15.7	17.6	17.9
60 to 64			14.2	16.1	15.2	19.1					12.7	15.6	15.8
65 to 69			14.8	15.8	17.6	16.4					13.2	14.3	16.0
Angle = 60°								Angle = 60°					

Fig. 19

Joint Age Weight Adduction-Left

Age	Joint Age Weight Adduction-Left						Joint Age Weight Adduction-Left							
	50-59	100-124	125-149	150-174	175-199	200-224	225-249	250-300	50-59	100-124	125-149	150-174	175-199	200-224
5 to 9														
10 to 14	10.8	12.5	13.9	16.3	19.0				10.1	10.2	12.4			
15 to 19									11.5	12.4				
20 to 24									12.7	13.4	12.7			
25 to 29									12.1	13.9	14.6			
30 to 34									12.1	15.6	16.0			
35 to 39									12.2	13.2	14.4	13.2		
40 to 44									12.3	12.3	12.2			
45 to 49									10.5	14.0				
50 to 54									12.7	12.7				
55 to 59									12.7					
60 to 64									13.1	14.4	13.5			
65 to 69									11.1	12.7	12.8			
									11.0	11.8	12.9			
5 to 9														
10 to 14	12.1	13.4	15.8	18.1	20.9				11.3	10.2	12.9			
15 to 19									10.8	13.4				
20 to 24									13.7	14.4	14.1			
25 to 29									11.9	15.2	17.2			
30 to 34									13.8	16.9	18.4			
35 to 39									12.0	14.6	16.5	13.7		
40 to 44									12.5	12.5	12.1			
45 to 49									11.1	15.1				
50 to 54									15.1	13.5				
55 to 59									14.7	14.5	15.8			
60 to 64									12.1	13.9	15.1			
65 to 69									12.6	13.2	14.3			
5 to 9														
10 to 14	12.4	14.5	17.1	19.2	20.3				11.6	10.8	13.8			
15 to 19									11.6	15.4				
20 to 24									14.7	15.7	14.9			
25 to 29									11.8	16.5	18.3			
30 to 34									13.9	18.4				
35 to 39									12.8	15.2	15.7	14.3		
40 to 44									13.6	13.6	13.2			
45 to 49									12.8	16.3				
50 to 54									16.0	14.6				
55 to 59									16.0	16.4	18.7			
60 to 64									13.3	15.8	16.5			
65 to 69									13.6	14.4	15.0			

Angle = 60°

FIG. 20

Grip Strength by Age and Weight for Male and Female Left and Right

Male Left / Right Grip

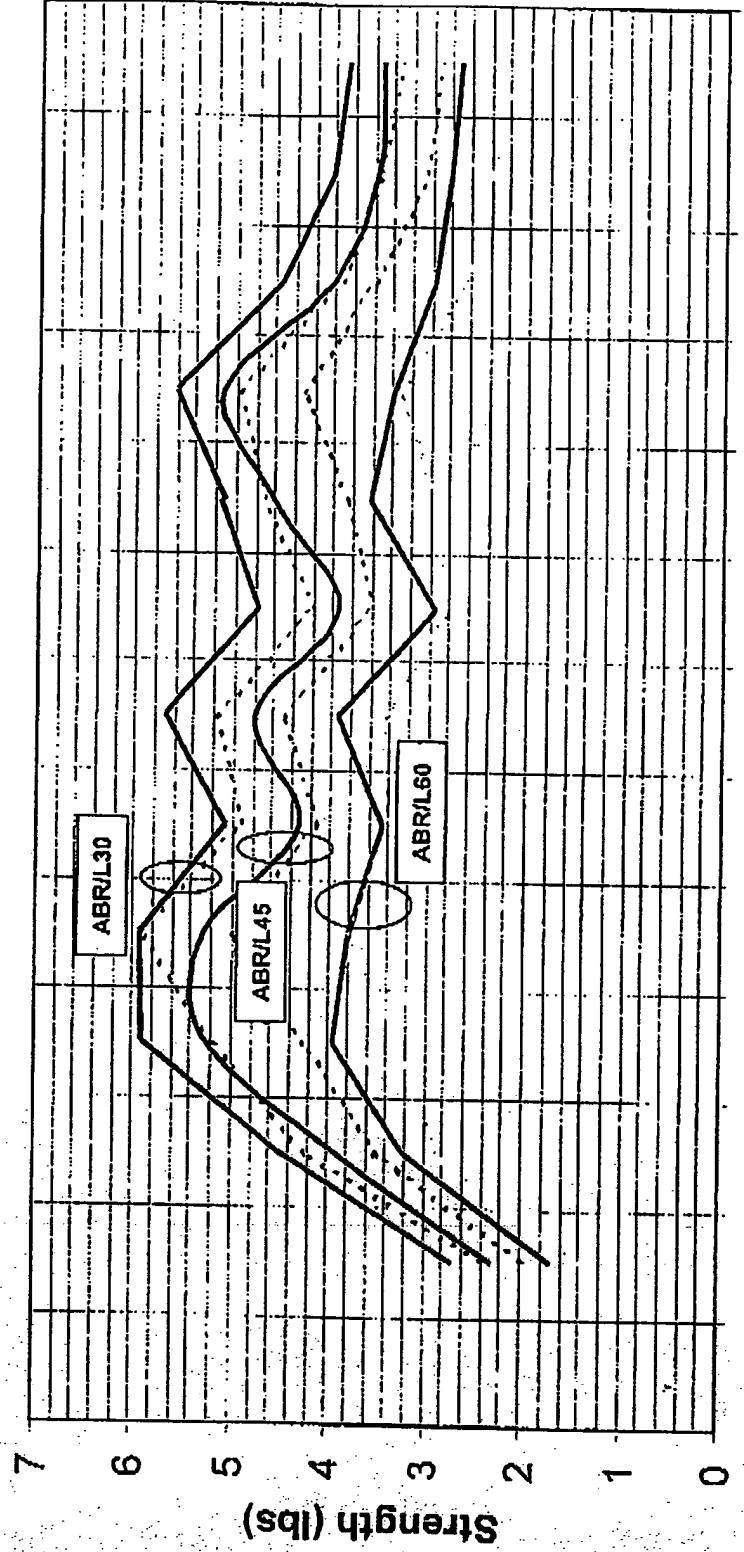
Weight	50 to 99	100 to 124	125 to 149	150 to 174	175 to 199	200 to 224	225 to 249	250 to 300
Age								
10 to 14		59 / 66	68 / 70	93 / 97	101 / 104	110 / 120		
15 to 19			94 / 110	118 / 125	130 / 137			
20 to 24				114 / 117	128 / 132	129 / 137		
25 to 29				105 / 108	120 / 126			
30 to 34				110 / 114	117 / 126	126 / 136		
35 to 39				94 / 96	105 / 108	128 / 139	111 / 119	
40 to 44				97 / 98	96 / 103	119 / 125		
45 to 49					97 / 100	106 / 110	105 / 113	
50 to 54					98 / 101			
55 to 59					77 / 83			
60 to 64					89 / 92			
65 to 69					84 / 84			

Female Left / Right Grip

Weight	50 to 99	100 to 124	125 to 149	150 to 174	175 to 199	200 to 224	225 to 249	250 to 300
Age								
10 to 14	56 / 56	63 / 59	74 / 70	82 / 82				
15 to 19	66 / 60	77 / 71						
20 to 24	84 / 78	78 / 71	80 / 74					
25 to 29	58 / 51	81 / 74	83 / 77					
30 to 34	66 / 61	72 / 64	81 / 84	79 / 75				
35 to 39		79 / 72	80 / 73	81 / 80				
40 to 44		65 / 62	71 / 69					
45 to 49		68 / 64	75 / 72					
50 to 54		66 / 65	65 / 61					
55 to 59		69 / 64	72 / 70	77 / 73				
60 to 64		58 / 54	70 / 68	71 / 66				
65 to 69		66 / 59	69 / 65	75 / 69				

Fig. 21

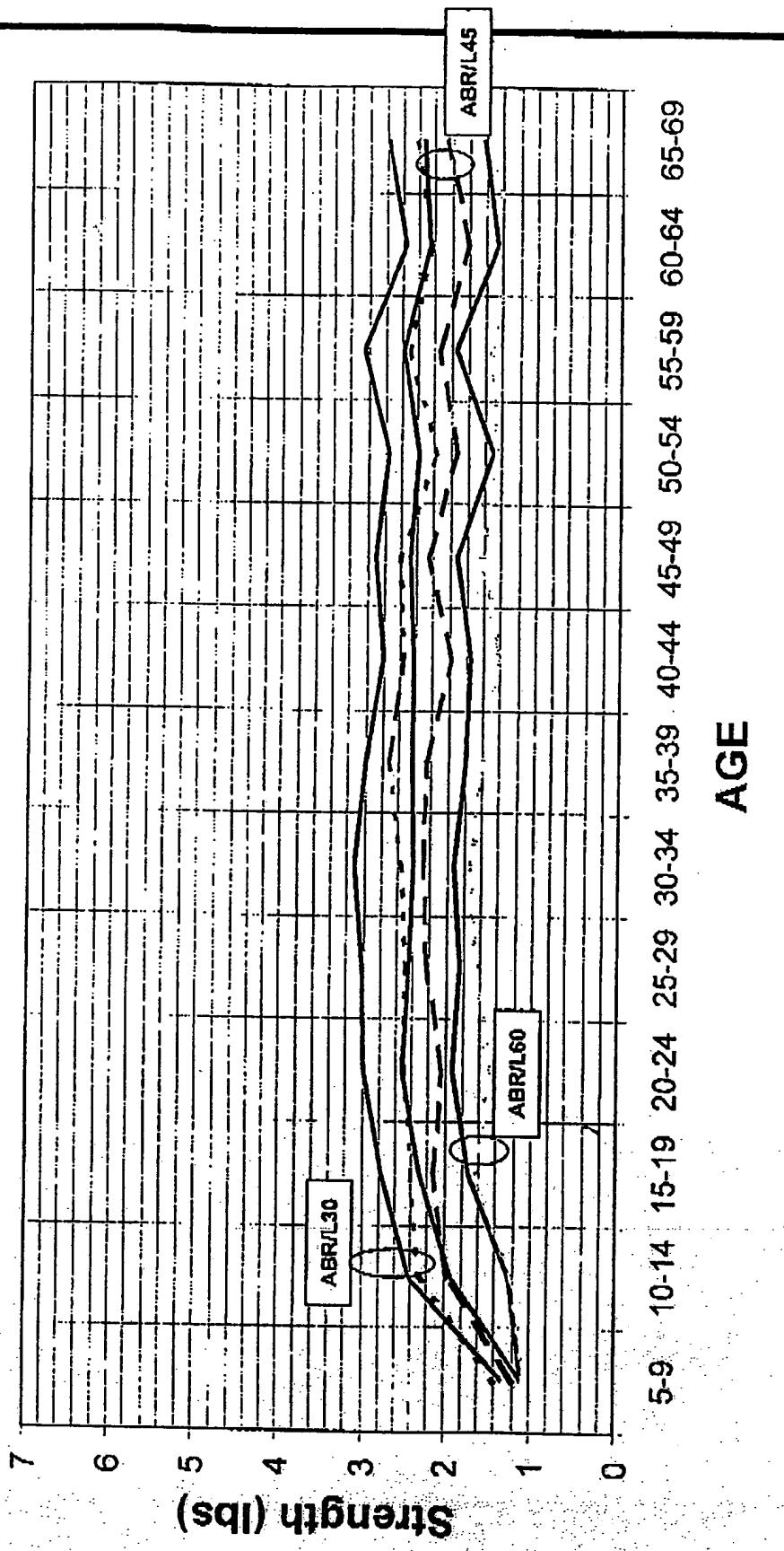
MALE Abduction by Age Right Dominant



AGE

FIG. 22

FEMALE Abduction by Age Right Dominant



F16. 23

MALE Abduction by Weight Right Dominant

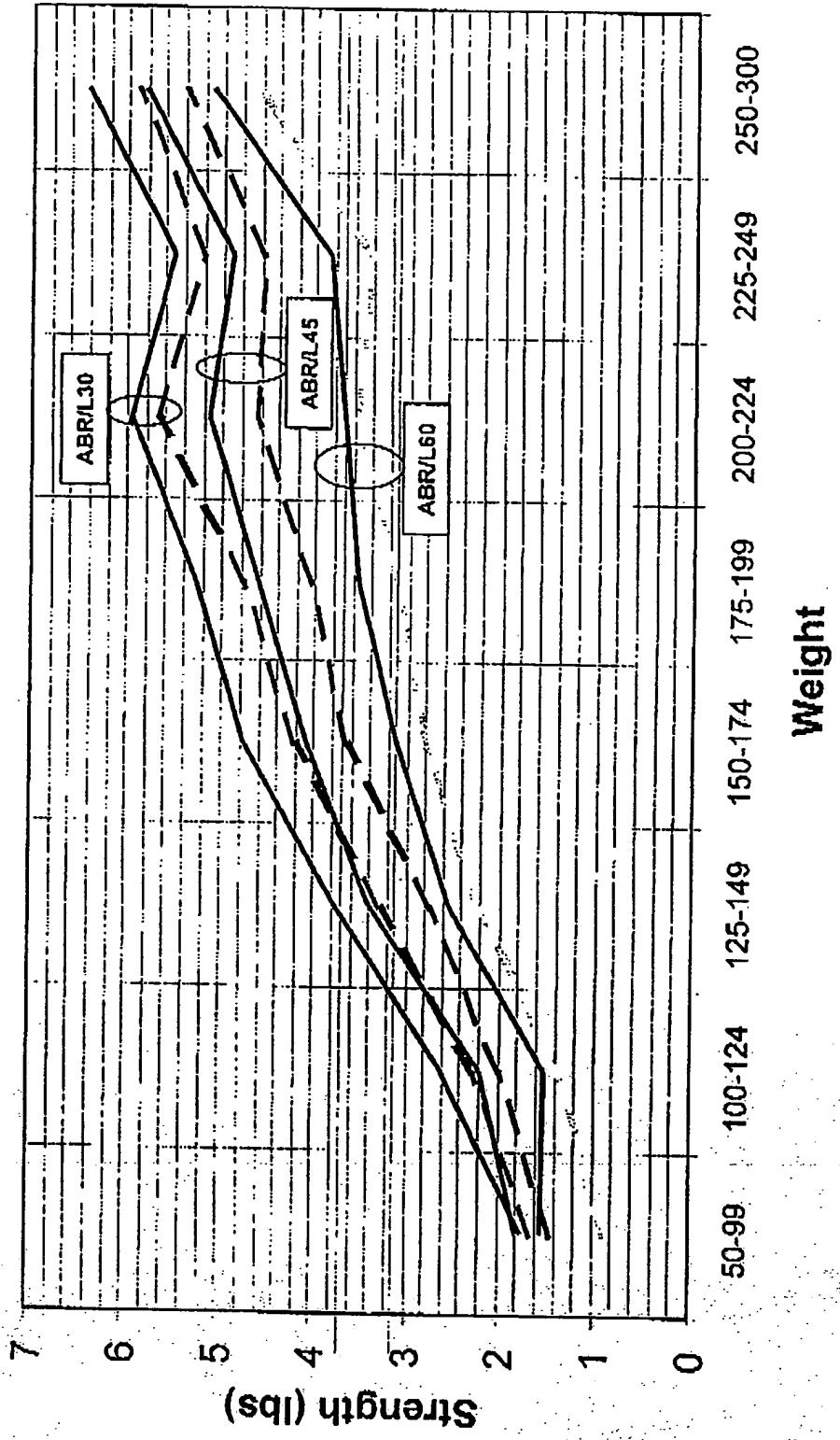
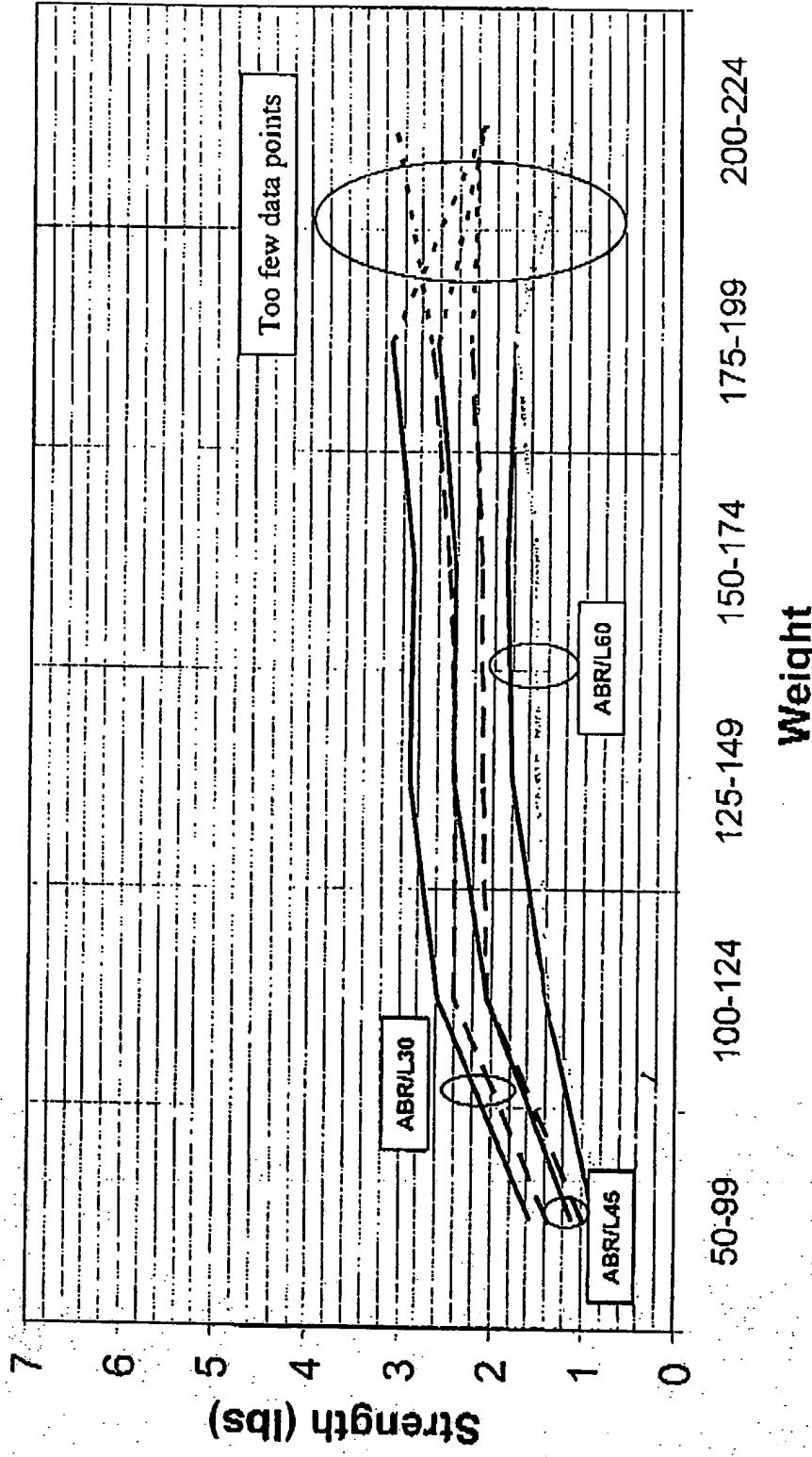


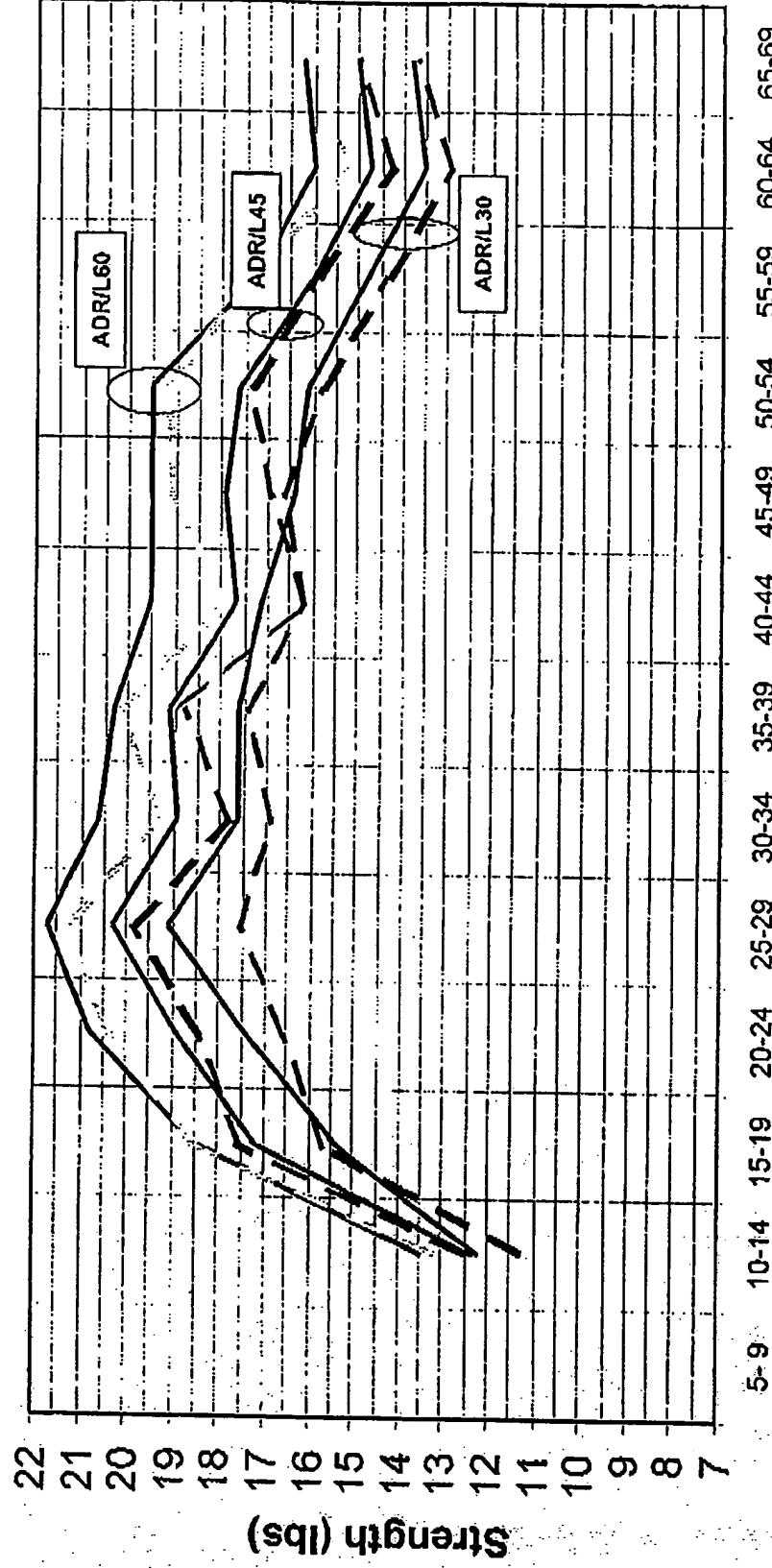
Fig. 24

FEMALE Abduction by Weight Right Dominant



F16 25

MALE Adduction by Age Right Dominant



AGE

F16. 26

FEMALE Adduction by Age Right Dominant

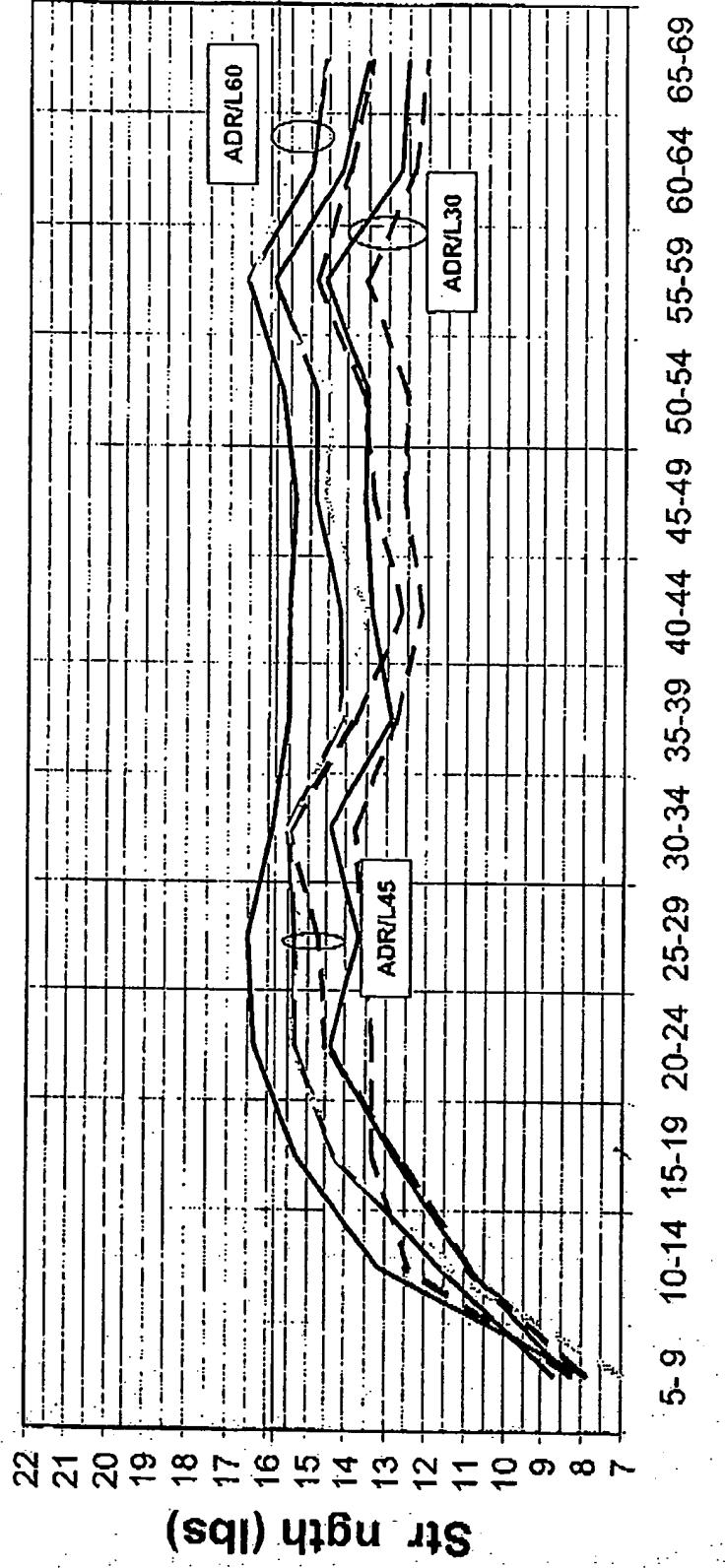


Fig. 27

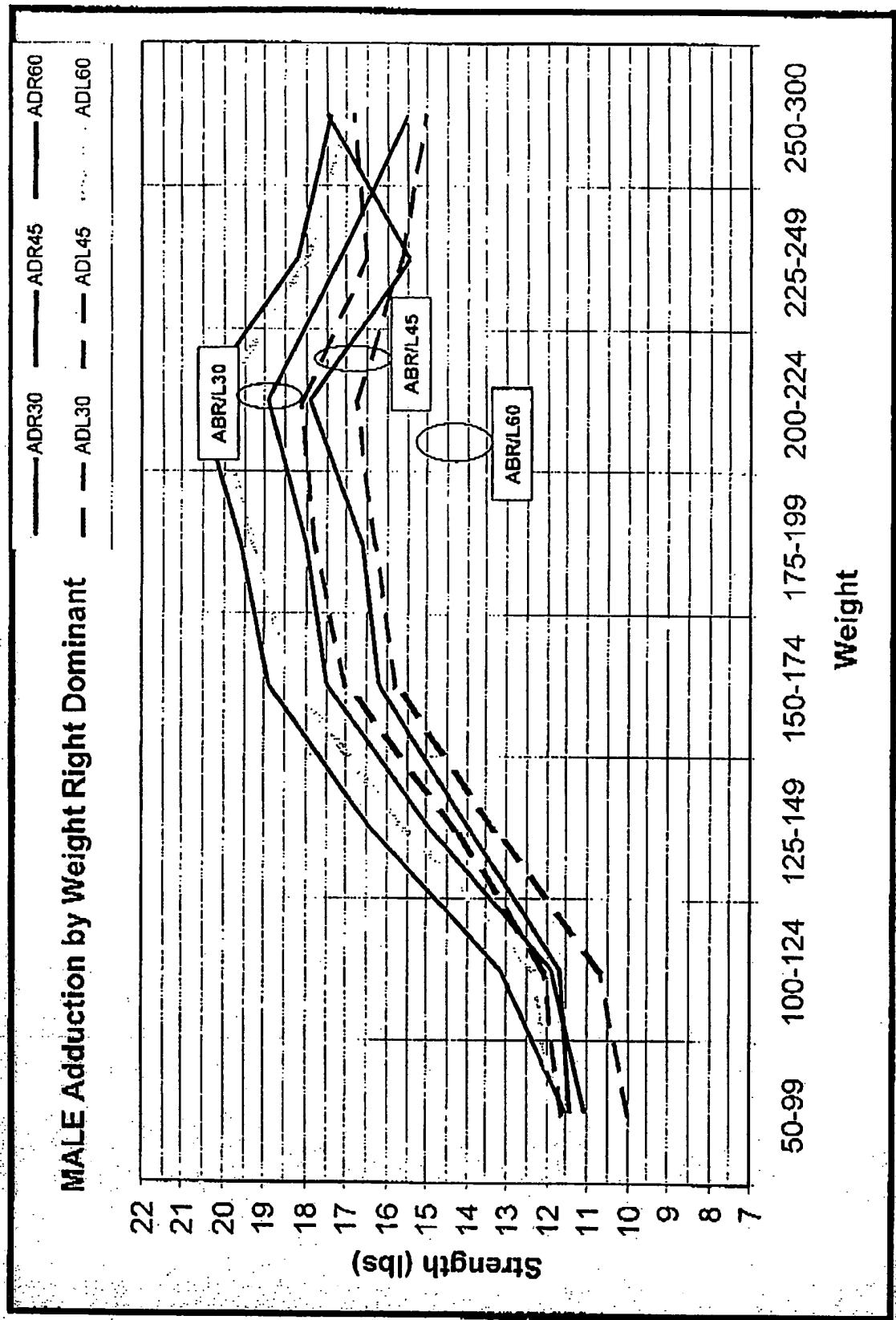


Fig. 28

FEMALE Adduction by Weight Right Dominant

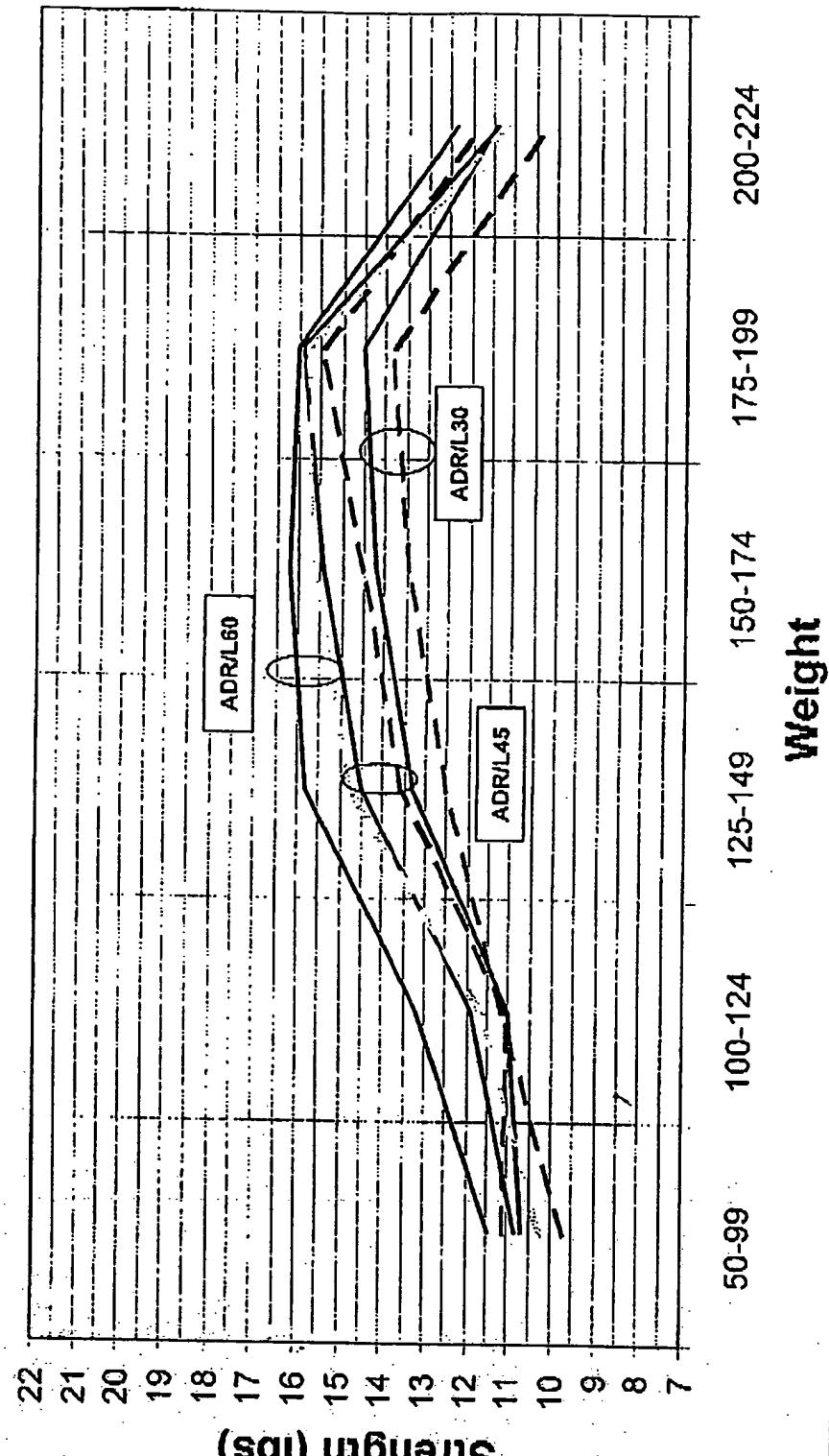
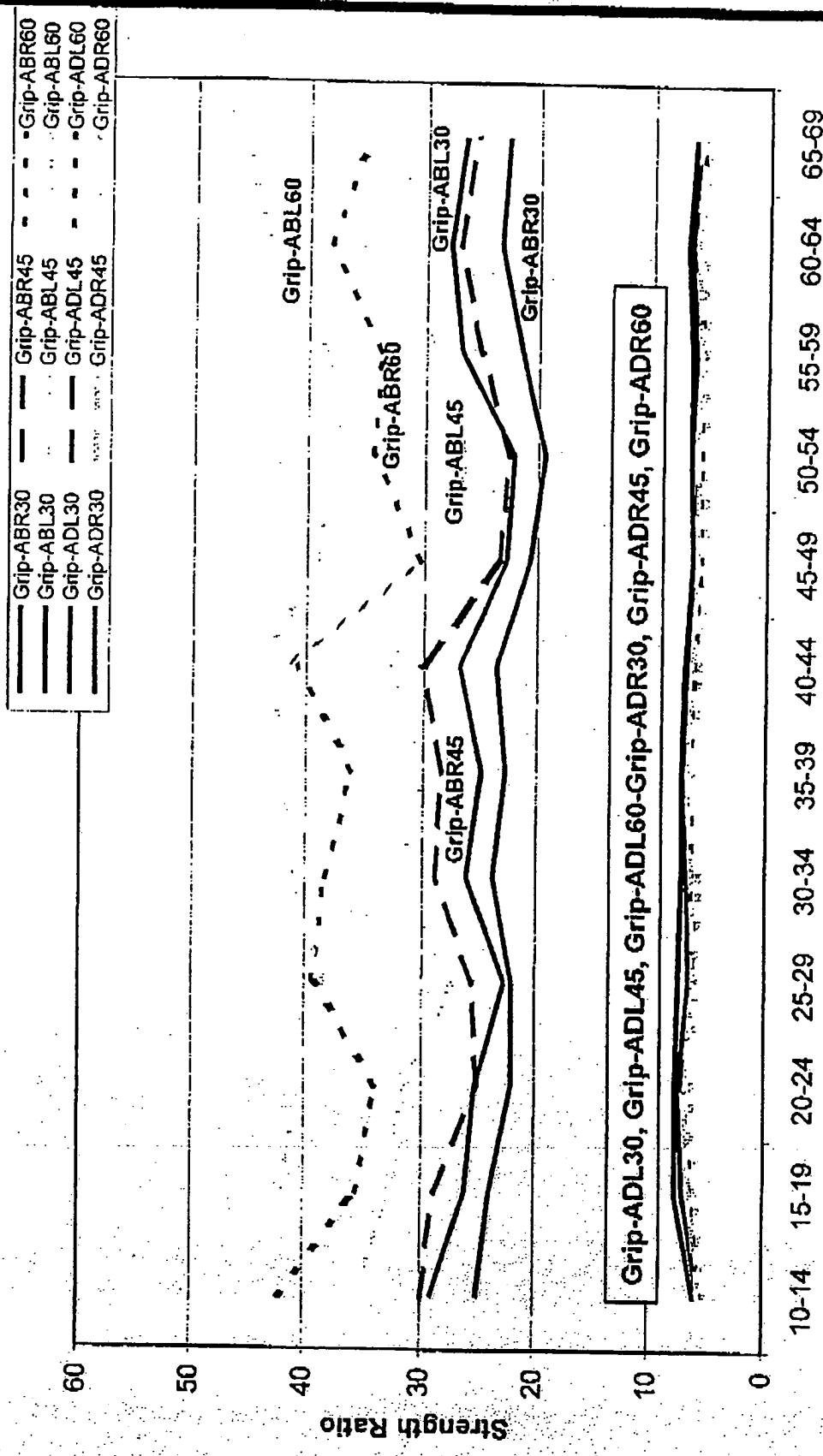


Fig. 29

Male Grip Strength to Abduction and Adduction Left and Right



Age Group

Fig. 30

Correlation Coefficients for All Subjects

Males

Variables	Weight	R-Grip	L-Grip	ABR30	ABR45	ABR60	ADR30	ADR45	ADR60	ABL30	ABL45	ABL60	ADL30	ADL45	ADL60
Age	0.41	-0.16	-0.16	-0.01	0.01	-0.02	-0.11	-0.08	-0.08	-0.07	-0.02	-0.03	-0.07	-0.11	-0.08
Weight	0.46	0.48	0.5	0.46	0.46	0.35	0.35	0.35	0.35	0.5	0.46	0.42	0.33	0.33	0.38
R-Grip				0.75	0.67	0.64	0.74	0.73	0.75	0.73	0.64	0.59	0.65	0.65	0.68
L-Grip				0.71	0.69	0.64	0.73	0.72	0.74	0.77	0.69	0.64	0.68	0.68	0.71
ABR30					0.85	0.62	0.63	0.65	0.64	0.84	0.83	0.8	0.57	0.55	0.61
ABR45						0.87	0.55	0.57	0.57	0.78	0.81	0.77	0.52	0.5	0.56
ABR60							0.52	0.55	0.56	0.73	0.76	0.78	0.55	0.5	0.52
ADR30								0.86	0.86	0.6	0.56	0.5	0.72	0.73	0.74
ADR45									0.86	0.86	0.57	0.56	0.51	0.79	0.82
ADR60										0.6	0.59	0.53	0.79	0.79	0.83
ABL30											0.88	0.88	0.81	0.57	0.61
ABL45												0.87	0.55	0.55	0.57
ABL60													0.51	0.49	0.5
ADL30													0.86	0.82	0.82
ADL45														0.88	0.88

Females

Variables	Weight	R-Grip	L-Grip	ABR30	ABR45	ABR60	ADR30	ADR45	ADR60	ABL30	ABL45	ABL60	ADL30	ADL45	ADL60
Age	0.52	-0.04	-0.01	0.01	0.07	0	0.07	0.08	0.07	0.03	0.01	0.02	0.06	0.13	0.19
Weight	0.35	0.37	0.23	0.26	0.2	0.28	0.32	0.29	0.21	0.17	0.22	0.26	0.33	0.31	
R-Grip			0.58	0.55	0.51	0.56	0.62	0.62	0.42	0.4	0.39	0.49	0.52	0.55	
L-Grip			0.49	0.45	0.41	0.53	0.58	0.57	0.49	0.46	0.41	0.56	0.58	0.58	
ABR30				0.73	0.41	0.42	0.48	0.62	0.58	0.56	0.57	0.31	0.31	0.34	
ABR45					0.35	0.38	0.43	0.56	0.56	0.57	0.57	0.31	0.31	0.34	
ABR60						0.32	0.32	0.36	0.51	0.51	0.57	0.3	0.31	0.34	
ADR30							0.88	0.85	0.82	0.32	0.3	0.23	0.69	0.74	0.74
ADR45								0.88	0.88	0.3	0.31	0.26	0.74	0.75	0.74
ADR60									0.36	0.35	0.26	0.72	0.72	0.72	0.74
ABL30										0.82	0.63	0.4	0.4	0.4	
ABL45											0.77	0.39	0.38	0.41	
ABL60												0.3	0.29	0.31	
ADL30													0.88	0.88	
ADL45														0.88	

FIG. 31